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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/413,644	10/06/1999	NEIL RICHARDS	S1022/8338	2260

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EXAMINER	
PHILPOTT, JUSTIN M	

ART UNIT	PAPER NUMBER
2665	11

DATE MAILED: 04/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/413,644	RICHARDS ET AL.	
	Examiner	Art Unit	
	Justin M Philpott	2665	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 January 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☒ The proposed drawing correction filed on *21 January 2003* is: a)☒ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *10* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Response to Amendment

1. In the Amendment filed January 21, 2003, Applicant has corrected minor informalities in the specification and in the drawings regarding reference signs in the drawings. Accordingly, the specification is no longer objected to and the proposed drawing correction is approved. Additionally, Applicant has amended claim 5 to overcome the rejection under 35 U.S.C. 112, second paragraph. Furthermore, in view of Applicant's comments regarding claims 2 and 10, the rejection of these claims under 35 U.S.C. 112, second paragraph has been removed.

Response to Arguments

2. Applicant's arguments regarding the rejection of claim 1 under 35 U.S.C. 103(a) as being unpatentable over Mills in view of Byrn have been considered but are not persuasive.

First, Applicant argues that the rejection of claim 1 over the combination of Mills and Byrn is improper because one of ordinary skill in the art would not be motivated to modify the processing system of Mills to provide improved priority-based ATM cell transmission. In the Office Action mailed October 18, 2002 the Examiner stated, "the ATM scheduler taught by Byrn may advantageously be applied to the data transmission unit taught by Mills in order to provide an apparatus capable of improved priority-based ATM cell transmission". The Examiner maintains that at the time of the invention it would have been obvious to one of ordinary skill in the art to apply the teachings of Byrn to the data transmission unit of Mills in order to provide an apparatus capable of improved priority-based ATM cell transmission. However, for further

explanation of this motivation to combine the teaching of Byrn with that of Mills additional explanation of Byrn and Mills is provided in the following. Mills teaches a method of utilizing shared processing hardware for providing a multimedia distribution system with improved efficiency and reduced cost and complexity. Specifically, Mills teaches a multimedia distribution system for ATM segmentation and reassembly and particularly, Mills teaches an apparatus using ATM data streams in a processing system suitable for applications providing video, audio, graphics, input/output communication and other functions (col. 2, lines 1-6) operable with multimedia distribution systems including cable or community access television, telephone systems, and computer networks (col. 1, lines 36-50). Byrn teaches that in the art of ATM data stream transmission it is commonly known that systems using such transmission are very poor at supporting different traffic types with variable inter-arrival rates (col. 2, lines 19-32). The teachings of Byrn provide for improved priority-based ATM data stream transmission in an ATM system having sessions requiring various transmission rates, e.g., a multimedia system such as that taught by Mills. Specifically, Byrn provides: a reduced number of operations performed in a cell time while maintaining accurate scheduling; simple insertion of cells into queues based on priority, rate and TTT without required searching of queues; reduced number of queue entries that must be visited each scheduling cycle; and scheduling of data streams/cells with a wide range of transmission rates (col. 2, line 66 – col. 3, line 10). Thus, at the time of the invention it would have been obvious to one of ordinary skill in the art to apply the ATM data stream transmission teachings of Byrn to the ATM data stream multimedia system of Mills in order to provide a reduced number of operations performed in a cell time while maintaining accurate scheduling; simple insertion of cells into queues based on priority, rate and

TTT without required searching of queues; reduced number of queue entries that must be visited each scheduling cycle; and scheduling of data streams/cells with a wide range of transmission rates.

Second, Applicant argues that the MMU 8 in combination with memory 4 and VCA 7 do not store a scheduling variable (r, p), and that even if r and p are stored at all they would be stored in the CSU 9. These statements by Applicant, however, are incorrect. Specifically, Byrn states, "The QID, TTT, priority (p), and wheel rate (r) are passed to the CSU through path d" (col. 4, lines 57-59). The fact that scheduling variables p and r are passed *to* the CSU *from* the VCA indicates that such variables are determined by the combination of MMU, memory and VCA prior to being passed to the CSU. Furthermore, Byrn clearly teaches priority and rate elements are stored within the VCA in VC Information Table depicted in FIG. 3 comprising "flow parameters 34" and "priority 36". Byrn also clarifies that flow parameters comprise rates RP and RM (see col. 5, line 60 – col. 6, line 10). Thus, Byrn clearly teaches storing scheduling variables r and p with the combination of MMU, memory and VCA.

Third, Applicant argues that contrary to claim 1, Byrn selects wheels that have cells scheduled for transmission *after* a current time, and not *before* a current time as claimed. Specifically, claim 1 recites, "if that scheduled transmission timing *is not earlier* than the current timing, ..." [emphasis added]. For clarification with respect to the present and any future arguments, the phrase "not earlier than" is interpreted to be equivalent to "on or after". Regarding Applicant's comments, Applicant is reminded that the scheduled transmission timing of claim 1 is equivalent to TTT in Byrn, and the current timing of claim 1 is equivalent to CTT of Byrn. Accordingly, Applicant's reference to Byrn on page 7, line 4 stating, "a target

transmission time is evaluated for each queue, and signals are generated for each target transmission time at a time at least after each target transmission time is reached" (col. 3, lines 16-29), does *not* correspond with Applicant's statement that, "Byrn purposely selects wheels that have cells scheduled for transmission after a *current time*" [emphasis added] (page 7, lines 1-2). In the above citation, Byrns refers solely to TTT (scheduled time) and makes *no* reference to CTT (i.e., current time). Furthermore, the above citation indicates only that "signals are generated" at that time, and no reference is being made to the actual scheduling itself. Conversely, Byrns teaches that if the scheduled transmission timing (TTT) is not earlier than the current timing (CTT), generating an indication of the data stream corresponding to the selected scheduling variable (see col. 6, lines 34-54, particularly lines 34-37 and 52-54, as well as col. 5, lines 4-28 and particularly lines 24-26; wherein cells with a TTT<=CTT are serviced while the other cells of lower priority remain queued with pointers (col. 3, line 62) serving as indications of the data stream corresponding to the particular Wp,r).

Fourth, Applicant argues that Byrn does not teach incrementing p and r parameters. However, as discussed in the previous Office Action, Byrn clearly teaches incrementing the selected scheduling variable Wp,r (i.e., incrementing the wheel Wp,r according to rate r in order to examine the next highest priority queue) comprising specific p and r parameters (see col. 4, lines 33 – col. 6, line 65). That is, incrementing Wp,r directly corresponds with an increased p and r parameter. Thus, Byrn clearly teaches incrementing a selected scheduling variable as recited in claim 1.

Finally, Applicant argues that Byrn is based around the transmission of individual cells while claim 1 recites a scheduling variable which corresponds to a scheduled transmission timing

of a data stream and not an individual cell of a data stream. On the contrary, Byrn clearly teaches and is based around the transmission of data streams. Specifically, Byrn recites, "Accordingly, this invention provides a method and apparatus for scheduling the transmission of a number of data streams over a common communications link" (col. 3, lines 11-13). Byrn continues, stating, "cells from the data streams are stored in corresponding queues where there is one queue corresponding to each data stream" and "a target transmission time is evaluated for each queue" (col. 3, lines 11-29). Furthermore, the scheduling variable of Byrn (wheel Wp,r corresponding to particular p and r values) corresponds to the TTT (col. 6, lines 21-65). Thus, the scheduling variable of Byrn (Wp,r) clearly corresponds to the scheduled transmission timing (TTT) of a data stream and not to an individual cell of a data stream.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,088,355 to Mills et al. in view of U.S. Patent No. 5,533,020 to Byrn et al.

Regarding claim 1, Mills teaches a data transmission apparatus for transmitting data from a plurality of data streams over a data channel, and in particular, teaches such a system with pointer-based ATM segmentation and reassembly. However, Mills does not teach an ATM scheduler. Byrn teaches a priority-based ATM cell scheduler for a data transmission apparatus. Particularly, Byrn teaches a scheduler comprising the following:

a data stream control memory (Memory Management Unit MMU 8 in combination with memory 4 and VCA 7, see FIG. 1) for storing (via VCA 7, see col. 4, lines 55-56) a scheduling variable (e.g., VC transmission requirement corresponding to rate r, see col. 4, lines 40-43, and QOS parameters corresponding to priority p, see col. 4, lines 53-54) for each data stream, each scheduling variable (p, r) being indicative of a scheduled transmission timing (Target Transmission Time TTT, see col. 4, lines 53-59) for that data stream,

a clock (reference clock, see col. 4, line 22) for maintaining a current timing indication (Current Transmission Time CTT, see col. 4, line 21), and

a data stream selector (cell scheduling unit CSU 9 in combination with timing wheels, see col. 4, line 33 to col. 5, line 59) for, at time intervals (depending on rates r, see col. 4, lines 33-52), comparing the scheduling variables (p, r) stored in the memory and selecting the scheduling variables (p, r in the form of timing wheel Wp,r) indicative of the earliest scheduled transmission timing (TTT) (see col. 4 regarding CSU 9 wherein Wp,r selection is indicative of TTT) and, if that scheduled transmission timing (TTT) is not earlier than the current timing (CTT), generating an indication of the data stream corresponding to the selected scheduling variable (see col. 6, lines 34-54, particularly lines 34-37 and 52-54, as well as col. 5, lines 4-28 and particularly lines 24-26 – wherein cells with a TTT<=CTT are serviced while the other cells of lower priority remain queued with pointers (col. 3, line 62) serving as indications of the data stream corresponding to the particular Wp,r) and incrementing the selected scheduling variable (i.e., incrementing the wheel Wp,r according to rate r in order to examine the next highest priority queue).

The ATM cell scheduler taught by Byrn may advantageously be applied to the data transmission unit taught by Mills in order to provide an apparatus capable of improved priority-based ATM cell transmission. Thus, at the time of the invention it would have been obvious to one of ordinary skill in the art to apply the ATM scheduler of Byrn to the apparatus of Mills.

Regarding claim 2, Byrn teaches the data stream control memory (Memory Management Unit MMU 8 in combination with memory 4 and VCA 7, see FIG. 1) storing an increment variable (rate r), and to increment the selected scheduling variables (e.g., increment the position of the wheel Wp,r) the data stream selector (cell scheduling unit CSU 9 in combination with timing wheels) adds the selected scheduling variable (current position of wheel Wp,r) to the increment variable (rate r) (or rather, adds the increment variable to the selected scheduling variable) for the corresponding data stream.

Regarding claim 3, Byrn teaches at least one data memory (memory 4, see FIG. 1) for storing the data streams. As discussed above, Mills teaches a data transmission unit which would be obvious to retrieve the amount of data from the data memory (memory 4) before transmitting it over a data channel.

Regarding claims 4 and 5, Byrn teaches the data stream control memory storing a pointer variable for each data stream (see col. 4, lines 51-67 regarding Virtual Connection queue pointers in MMU 8), and retrieving the amount of data from the location in the data memory (memory 4) indicated by the pointer variable of the selected data stream (see col. 5, lines 42-46). Regarding claim 5, see also col. 5, lines 13-16.

Regarding claim 6, Byrn teaches a reference clock (col. 4, line 22) which anticipates the period between successive comparisons of the scheduling variables being substantially constant.

Regarding claims 7 and 8, Byrn teaches a data stream controller which provides an indication of a data stream from which to transmit data in accordance with scheduling variables Wp,r. However, it would be obvious to provide means for overriding the data stream controller in the event a particular priority and rate schedule is desired which could not be determined by the VC transmission requirements or QOS parameters (which determine p and r according to CSU 9) – i.e., such as a preset override. Regarding claim 8, a responsive transmission unit would be obvious in view of Mills.

Regarding claim 9, in the event of, for example, a preset override as discussed above, periodic comparison of the scheduling variables by the data stream selector would no longer be required for the duration of the override of the data stream selector. Thus, at the time of the invention it would have been obvious to one of ordinary skill in the art to disable periodic comparison of the scheduling variables in order to conserve processing power.

Regarding claim 10, see the above regarding claim 2 and claim 7. Furthermore, Byrn teaches means for varying the increment variables (wherein different rates r correspond to difference increment variables).

Regarding claim 11, Byrn teaches the ATM scheduler provided on a single integrated circuit (see col. 6, lines 66-67). Mills also teaches an ATM SAR device comprising a receiver, transmitter and CRC processor all within a single integrated circuit (ASIC processor, see col. 31, lines 63-65). Therefore, at the time of the invention it would be have been obvious to one of ordinary skill in the art to combine the ATM scheduler and ATM SAR (comprising the transmission apparatus, or transmitter) within a single integrated circuit in order to provide a more robust data transmission apparatus with reduced complexity.

Regarding claim 12, Mills teaches an apparatus further comprising a central processing unit (CPU, col. 33, line 65).

Regarding claim 13, see the above regarding claim 11 and claim 12.

Regarding claim 14, Mills teaches software on CPU wherein the CPU programmably controls the period between cell transmission in dependence of quality of service QOS (col. 39, lines 24-27). Byrn teaches a scheduling variable (p) dependent upon QOS (col. 4, lines 53-54). Thus, Mills in view of Byrn anticipates a CPU which further programmably controls the period between successive comparisons of scheduling variables (p) which are also dependent upon QOS.

Regarding claim 15, Mills teaches first and second non-integer-multiple clock rates (col. 3, lines 4-33) and thus, anticipates the speed of a system clock being variable. Mills further teaches the apparatus comprising a central processing unit (CPU, col. 33, line 65). Thus, at the time of the invention it would have been obvious to one of ordinary skill in the art to vary the speed of the clock via the central processing unit.

Regarding claim 16, while neither Mills nor Byrn teach an amount of data specifically being 384 bits, both Mills and Byrn teach ATM cell transmission-related processes. Thus, at the time of the invention it would have been obvious to one of ordinary skill in the art to use a specific amount of data, such as 384 bits.

Regarding claim 17, Mills teaches an amount of data being transmitted together with header information (see col. 9, lines 42-63 regarding PES packet comprising stream data and identification information).

Regarding claim 18, both Mills and Byrn teach an amount of data in the form of an ATM cell.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Justin M Philpott whose telephone number is 703.305.7357. The examiner can normally be reached on M-F, 9:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy D Vu can be reached on 703.308.6602. The fax phone numbers for the organization where this application or proceeding is assigned are 703.872.9314 for regular communications and 703.872.9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.305.4750.

Justin M Philpott

March 24, 2003

HUY D. VU
SUPERVISORY PATENT EXAMINER
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